SECTION – A [10X2=20M]

NOTE: (i) Answer all questions.

(ii) Each question carries two marks.

(iii) All are very short answer type questions.

1. A concave mirror produces an image of a long vertical pin, placed 40cm from the mirror, at the position of the object. Find the focal length of the mirror
2. How many electron's constitue 1C of charge?
3. Can there be electric potential at a point with zero electric intensity ?Give an example.
4. Distinguish between Ammeter and Voltmeter.
5. Classify the following materials with regard to magnetism. manganese, nickel,bismuth, copper.
6. What is the phase difference between A.C emf and current in the following?

   i) Pure resistor ii) Pure inductor iii) Pure capacitor
7. Write down de broglie's relation and explain the terms therein.
8. Give two uses of infrared rays.
9. What is zener voltage and how will a zener diode be connected in circuits generally?
10. What are the basic blocks of a communication system?

SECTION – B [6X4=24M]

NOTE: (i) Answer any six of the following questions.

(ii) Each question carries four marks.

(iii) All are short answer type questions.

11. Explain using suitable diagrams, the formation of standing waves in a closed pipe. How may this be used to determine the frequency of a source of sound?

12. Explain Doppler effect in light. Distinguish between red shift and blue shift.

13. Three capacitors of capacitances 2PF, 3 PF and 4 PF are connected in parallel.

    a) What is the total capacitance of the combination?

    b) Determine the charge on each capacitor if the combination is connected to a 100 V supply.

14. Derive an expression for the intensity of the electric field at a point on the equatioral plane of an electric dipole.

15. Compare the properties of Dia,Para and Ferro magnetic materials.

16. Obtain an expression for the mutual inductance of two long coaxial solenoids.

17. Derive an expression for potential and kinetic energy of an electron in any orbit of a hydrogen atom according to Bohr's atomic model. How does, potential energy change with increasing n ?

18. Define NAND and NOR gate. Give their truth tables.

SECTION – C [2X8=16M]

NOTE: (i) Answer any two of the following questions.

(ii) Each question carries eight marks.

(iii) All are long answer type questions.

19. Describe a neat labelled diagram of a compound microscope and explain its working. Derive an expression for its magnification.

20. State Kirchoff's law for an electrical network. Using these law deduce the condition for balance in a wheatstone bridge.

If the balancing point in a meter bridge from the left is 60cm, compare the resistances in the left and right gaps of meter bridge.

21. What is radioactivity? State the law of radio active decay. Show that

radio active decay is exponential in nature.

Plutonium decays with a half life of 24,000 years. If plutonium is stored for 72,000 years, what fraction of it remains?